



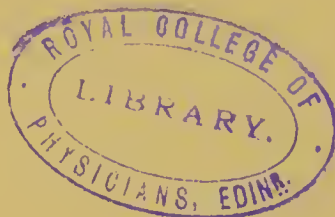


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BASED UPON A CRITICAL REVIEW OF THE FIRST  
THOUSAND PATIENTS DELIVERED IN THE  
OBSTETRICAL DEPARTMENT OF THE  
JOHNS HOPKINS HOSPITAL

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FROM  
OBSTETRICS  
Vol. I. No. 7, 1899.

R28695



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THE old idea that pelvic deformity was of great rarity in this country, which was largely due to the lack of accurate statistics and series of systematically measured cases, has given place (at least with those who have taken the trouble to measure the pelves of all cases) to the general opinion that, far from being a rarity, the percentage of pelvic deformity in this country is as high or even higher than in some of the German and French clinics. From time to time we have published the results of our observations on the frequency of contracted pelves in Baltimore, and our reports have corroborated the statement made by Dr. Williams in the first paper he read on this subject in the Spring of 1896, that contracted pelves are considered rare only because they are not systematically looked for by the routine examination and pelvic mensuration of all pregnant and parturient patients.

Accordingly, it is most important that all physicians interested in obstetrics should be well versed in the method of

diagnosis and treatment of the various varieties and degrees of pelvic contraction. Particularly true is this for those practicing in the Southern portion of the country, where the negro forms such an important element in the population; for with this race the occurrence of abnormalities of the pelvis is several times as frequent as in the whites, or so-called American-born women.

The material upon which this paper is based, the first thousand patients delivered in the Obstetrical Department of the Johns Hopkins Hospital, has been so thoroughly considered from the standpoint of frequency, variety, and degree of pelvic deformity found, in the paper by Dr. Williams, that no mention of these points will be made, but we shall limit ourselves to the consideration of the methods of treatment used in those cases in which the deformity was sufficient to cause an obstruction to labor, and the results.

While the subject of the treatment of pelvic dystocia has been thoroughly worked up in Germany by Stein, Michealis, and Litzmann, later by Leopold, Fischl, Müller, Gönner, Knäpp, Weidenmüller and Heinsius, and in France since the time of Baudelocque by Pinard, Farabœuf, Varnier, and many others, we find that in this country it has not received the consideration one might have expected, and that the only articles based on the systematic examination of cases which we have been able to find are those by Reynolds, of Boston; Flint, of New York, and Crossen, of St. Louis, together with the work of Dr. Williams and myself, to which I have already referred; and in the recent American text-books, the authors base their opinions upon the work done in Europe rather than upon statistics which have been published in this country.

Such being the state of affairs, we have thought that it would be interesting to consider the methods of treatment used by us in the management of labor complicated by pelvic deformity, and the results obtained both for the mother and infant, together with the morbidity, and any points we may have deduced in observing the series.

Operative interference has been necessary, for one cause or another, in one hundred and thirty-two instances in the one thousand cases. This puts our operative percentage at 13.2 per cent. for all indications such as rigidity of the soft parts,

prolongation of the second stage, large child, eclampsia, placenta previa, etc. On the other hand, our "pelvic indication" has been decidedly less, and on looking over our results I find that only forty-six of the above one hundred and thirty-two operations were performed in women with contracted pelves. This will put our operative percentage for contracted pelves at 4.6 for all cases; or in other words, 34.84 per cent. of all our obstetrical operations have been done upon women having contracted pelves. We have been able to find no other statistics in which the pelvic indication has been considered in its relation to other indications for operation, and the following table (Table I.) will show the various percentages for the different operations, both in the pelvic deformity and other indications:

(TABLE I.).

FREQUENCY OF "PELVIC INDICATIONS" IN VARIOUS OPERATIONS.

Operation.	No. in 1000 cases.	Pelvic in- dications.	Per cent. of various oper- ations in 1000 cases.	Per cent. of operations occurring in contracted pelves.
Forceps .....	81	21	8.1%	25.92%
Version .....	28	15	2.1%	53.57%
Extraction .....	14	4	1.4%	28.57%
Symphysiotomy.....	2	2	.2%	100.00%
Destructive operations .....	7	4	.7%	57.14%
Totals .....	132	46	13.2%	34.84%

We might further subdivide the pelvic indication column; for although in all these cases there was definite pelvic deformity, in a few of them the operation was done for the relief of some condition on the part of the mother; but owing to the small size of the children, there was no relative disproportion between the presenting part and pelvis. These cases are designated by the following numbers in our final tables:

<i>Forceps cases.</i>		<i>Version cases.</i>	
I. P.....H. 37	} Prolonged second stage. Head in pelvis.	M. M.....H. 320.	Placenta previa
L. L.....H. 118		L. J.....H. 279.	} Eclampsia.
A. F.....H. 28		B. B.....H. 219.	
S. S.....O. 151			
E. K.....O. 216			

Thus 38 operations were done for the pelvic indications. But the entire 46 operations, which were performed upon



women having contracted pelves, will be used in making up our statistics of mortality and morbidity.

As will be seen by referring to Table II., there occurred 131 contracted pelves in our series of 1,000 cases, and in this number, 46, or 35.11 per cent., were of such a degree as to necessitate operative delivery; and comparing these figures with those given by other observers, we find that they are decidedly lower than the figures given by the Germans. Thus Heinsius in Breslau puts the operative frequency at 56.84 per cent.; Ludwig and Savor in Vienna, at 45.6 per cent.; Knapp in Prague, 61 per cent.; Wiedling in Halle, 46.7 per cent.; Toth in Budapest, 46.5 per cent.; Franke, 20.5 per cent.; Braunn-Herzfeld, 64 per cent.; Bosmann, 24.5 per cent., and Gönner, 46 per cent. Our American authors do not give us such reliable figures: For example, Reynolds of Boston, although estimating that 6.8 per cent. of 2,127 women upon whom he bases his statistics have contracted pelves, admits that only those requiring operation were measured, with the exception of 100 cases; and as there were only 4 spontaneous deliveries in the 29 contracted cases, which he gives in tabular form, it would appear to be impossible for us to draw any definite conclusions from his statements. Flint, in New York, on the other hand, has 67 operations in 146 cases of contracted pelves, putting his operative percentage at 46 per cent.; and Crossen, of St. Louis, although he lays little stress on the operative frequency, operated upon 12 out of 28 cases, or 42.8 per cent.

In our first 350 cases, which I reported in detail in 1897, there were 40 contracted pelves, in 21 of which operations were necessary, or something over 50 per cent. I cannot account for this difference in figures, except by supposing that in the early history of the clinic more cases which had previously had difficult labors were sent to us, and also that we have learned to operate less frequently as our own experience has increased. Another factor, which I am sure makes our operative percentage lower than that given by Flint and Crossen, is the large number of negroes we have in our clinic. As Dr. Williams has already shown, the generally contracted pelves are very frequent in this race; but he has also shown that the degree of contraction is rarely sufficient to obstruct labor, as these individuals have small children with easily moulded



heads. This fact has materially increased the number of spontaneous births in our contracted cases.

As regards the variety of pelves with which we have met and the relative frequency with which they required operation, we have made use of the usual classification, and divided our pelves as follows: (1) Generally contracted pelves, in which all of the measurements indicate contraction and the patient frequently presents other signs of retarded development. (2) Flat rachitic, with common signs of rachitic deformity in the pelves, as indicated by internal and external measurements and vaginal examination, together with the usual signs of rickets in other parts of the body. (3) Simple flat pelves, or pelves presenting normal lateral measurements and contracted antero-posterior diameters. We have not distinguished between the generally contracted and the generally contracted flat pelvis, nor between the flat rachitic and the generally contracted rachitic pelvis, thinking that such classifications are superfluous. To the three classes above mentioned, we have added a fourth, containing those pelves whose occurrence is so rare as to make their separate classification impractical. This class we designate as irregular forms of pelvic deformity, and in it we have put seven pelves, in four of which deformity was due to an old unilateral coxalgia, in one to osteomalacia, in one to spondylolisthesis and one due to double congenital dislocation of the femora.

In our series of 1,000 cases, there occurred 79 generally contracted pelves, of which only 18 required operation; 20 flat rachitic pelves, 14 requiring operation, and 25 simple flat pelves, with 9 operative cases, and 7 irregular forms of pelvic deformity with operations in 5 cases. It is thus seen that the pelves most frequently requiring operation are the rachitic and irregular forms; while the generally contracted most often allows spontaneous delivery, the simple flat pelvis occupying a position between the two.

In the following table we give the several varieties of pelvic deformity and the frequency of operation in each variety, and we also give the percentage of such operations in the entire 1,000 cases, as well as the percentage in each variety:

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(TABLE II.).

## PELVES REQUIRING OPERATION.

Pelves.	No. in 1000 cases.	Operative.	Operative per cent. in 1000.	Per cent. in class.
Generally contracted .....	79	18	1.8%	22.78%
Flat rachitic .....	20	14	1.4%	70.00%
Simple flat .....	25	9	.9%	36.00%
Irregular forms .....	7	5	.5%	71.42%
Totals .....	131	46	4.6%	35.11%

Comparing these figures with those of the German observers, we find that the general opinion (Knapp, Weidenmuller, Gönner, and Ludwig and Savor) is that the operative percentage is higher in rachitic pelves, ranging from 28 to 84 per cent. The statistics of these observers also show a high operative percentage in the generally contracted, and generally contracted flat pelves; and again let me attribute the difference that exists between our figures and theirs (22.78% against from 15 to 60%) to the prevalence of the negro element in our clinic, in whom, although the pelvis is frequently contracted below the limits we have taken, the necessity for operation arises comparatively rarely.

In the American statistics, the variety of pelves is not sufficiently emphasized to allow us to draw any definite conclusions from them.

The operations in the above mentioned 46 cases have been: forceps, 21 cases; version, 15 cases; extraction of breech presentations, 4 cases; symphysiotomy, twice; and destructive operations on the dead child, 4 times. Cæsarean section has been done once in the thousand cases, but not for the pelvic indication. We have not induced premature labor in any of our cases of contracted pelves, as we think that better results can be obtained if the patient be allowed to carry her child to term, and then be delivered by one of the cutting operations if necessary. We feel justified in making this statement, for in a number of cases in which the induction of premature labor has been considered, good results have been obtained by the waiting policy.

Concerning the methods used in operating, little need be said. In our forceps operations we have not adhered to the usual method of applying the blades to the sides of the pelves, regardless of the position of the fetal head, but have always made the attempt to apply the blades nicely over the sides of the head, in its jugo-parietal diameter. The method employed is the one which has been so thoroughly described by Farabeuf and Varnier, in which the blade which will be over the posterior ear of the child, be it (the blade) right or left, is always applied first, and the second introduced in the opposite posterior quadrant of the pelvis, and rotated so as to articulate with its fellow. When the position is one that necessitates the primary introduction of the right blade, some difficulty may be experienced in crossing the blades in order to lock them, but this is of minor importance, and can be readily overcome. It is not always possible to get the blades nicely approximated over the ears of the child, and in such cases the operation is always more difficult; but we have found that if the attempt to do so be made in every case the results in the end will be better.

Version has been invariably done by the internal podalic method; no cases for which external version seemed suitable, having come under our observation. In head presentation we have always made the attempt to bring down both feet. However, one most frequently has to be satisfied with whichever foot is most accessible. In transverse presentation, on the other hand, one foot is taken by preference; as by so doing one can more readily bring about anterior rotation of the back of the child; and here also we have followed the rules laid down by Farabeuf and Varnier, choosing the low foot when the back is anterior, and the high foot when the back is directed posteriorly.

Extraction of breech presentation has been done four times, and offers little of interest. The two cases of symphysiotomy have been made by the open incision method of Pinard, and the bones brought together by silver wire sutures through the anterior pubic ligaments. We, however, do not think favorably of this operation. Under the head of destructive operations, I find three craniotomies and one decapitation.

They were all neglected cases, in which the children were dead before they came under our observation.

Having considered the kinds of pelves requiring operation and the operations in the various instances, we will turn to the results obtained by these operations both for the mother and the child. And in studying the mortality and morbidity, we shall first consider all the fetal and maternal deaths and all the abnormal puerperia and injuries to the children, designating this series as our actual mortality and morbidity statistics. As it is perfectly obvious that all deaths and injuries are not distinctly attributable to the operations done, but are due to other causes, we will make a second set of observations, which we shall designate as the corrected mortality and morbidity statistics.

The figures given by various observers for maternal morbidity and mortality vary greatly; thus we find that in the report of Heinius, the maternal mortality put at 6.3 per cent. and the morbidity at 13.9 per cent. for operative cases, against 0 per cent. and 5 per cent. for spontaneous labors in contracted pelves. Ludwig and Savor find a puerperal morbidity of 23.8 per cent. and a mortality of 5.2 per cent.; Knapp 3.12 per cent. morbidity and 1.56 per cent. mortality; and Toth a mortality of 13.9 per cent. and a morbidity of 47.5 per cent. With our American authorities we find the following results: Reynolds, in 33 operative cases, reports 1 maternal and 10 fetal deaths. In 10 operative cases, tabulated by Crossen, there were no fetal deaths before delivery, but one child died a few days later, the death in all probability not being due to the operation. There were, however, in this series three maternal deaths, one of which was due to tuberculosis, and not in any way attributable to the operation.

Flint, in 24 forceps operations and 33 versions, gave the following results: After the forceps operations, 1 maternal death, 5 still-born children, and two died shortly after delivery. After the versions, 2 maternal deaths and 12 still-born children and two others died shortly after birth.

Flint's fetal mortality after version, as ours, I think is too high, as the operation, when done at the proper time and in



the proper manner, should not yield so great a number of fetal deaths. (In Flint's cases, 14 deaths in 33 operations, and in our own statistics, 6 deaths in 15 cases).

Taking up our own results, and considering first the actual maternal mortality, we find that in the 46 operations there were 3 maternal deaths, making our actual maternal mortality 8.69 per cent. But when we consider that two of these cases were in a most serious condition when first seen, our actual maternal mortality is reduced to a corrected mortality of 1 in 46 cases or 2.17 per cent. In one of these cases we had to deal with a neglected labor in a woman with a generally contracted pelvis and large child, who had been infected by the midwife with the bacillus *ærogenes capsulatus* and streptococcus, and was practically moribund when first seen; while in the second case rupture of the uterus occurred before we saw the patient, who absolutely refused operative treatment. Our actual maternal mortality of 3 cases in 46 should accordingly drop to a corrected maternal mortality of 1 in 46 or 2.17 per cent.

In considering our fetal mortality, we find that the death rate is much higher, and on looking over the tables, we find that after the 46 operations 14 children were delivered dead, making our actual fetal mortality at 30.43 per cent.; but when we consider that in only 7 of the 14 was death distinctly due to the operation, it drops to a corrected mortality of 15.22 per cent. Our actual fetal mortality is better than that shown by German operators, as we find the following figures: Heinsius 32.5 per cent.; Knapp 48.43; and Toth 24.1.

Below I give in tabulated form the causes of our fetal and maternal deaths, the numbers referring to the clinic members in the final large tables.

(TABLE III.).

CAUSES OF MATERNAL DEATHS.

One rupture of uterus, before admission, low forceps.....	(C.D. O. 210)
One infection with bacillus <i>arogenes capsulatus</i> and streptococcus before admission, craniotomy.....	(P.A. O. 56)
One infection following symphysiotomy.....	(J.T. H. 261)
Total.....	Three deaths

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(TABLE IV.).

CAUSES OF FETAL DEATHS.

Two deaths due to forceps operations.....	{	M.M. H.	20
		M.B. O.	89
Four deaths due to versions; inability to extract rapidly enough.....	{	S.W. H.	107
		M.K. O.	116
		M.A. O.	208
		E.G. O.	618
Two deaths due to prolapse of umbilical cord.....	{	A.H. H.	139
		I S. O.	378
Five children dead before attempts at delivery.....	{	C.D. O.	210
		S.W. H.	290
		M.S. H.	316
		P.A. O.	56
		L.L. O.	144
One death due to inability to extract breech rapidly enough.....	(B.F.	H.	276
Total.....			14 deaths

Tables V. and VI. show the maternal and fetal mortality, both actual and corrected, worked out in percentage for the various operations.

(TABLE V.).

MATERNAL MORTALITY.

Operation.	No. of cases	Total Deaths.	Death due to operation.	Actual mortality.	Corrected mortality.
Forceps.....	21	1	0	4.76 %	0 %
Version.....	15	0	0	0 %	0 %
Extraction.....	4	0	0	0 %	0 %
Symphysiotomy.....	2	1	1	50. %	50. %
Destructive operations.....	4	1	0	25. %	0 %
Totals.....	46	3	1	8.69 %	2.17 %

(TABLE VI.).

FETAL MORTALITY.

Operation.	No. of children.	Delivered dead.	Death due to operation.	Actual mortality.	Corrected mortality.
Forceps.....	21	3	2	14.28 %	9.52 %
Version.....	15	6	4	40 %	26.66 %
Extraction.....	4	1	1	25 %	25 %
Symphysiotomy.....	2	0	0	0 %	0 %
Destructive operations.....	4	4	0	100 %	0 %
Totals.....	46	14	7	30.43 %	15.22 %

It is of the greatest importance to note the effect of the degree of pelvic deformity on the fetal mortality, and to show this we have divided our pelves in three classes, according to the size of the antero-posterior diameter. In doing this we have taken the conjugata diagonalis as our standard diameter, for this is the only antero-posterior diameter which can be directly measured with accuracy, and the conjugata vera, being estimated from this, is subject to variation with the pelves and the operator making the measurement. In the first class of cases we have put those pelves the diagonalis of which is between 11.5 and 10.5 cm., in the second class those between 10.5 and 10 cm., and in the third all in which this diameter falls below 10 cm. In Class I., there were 28 cases with 7 fetal deaths—a mortality of 25 per cent.; in Class II., 10 cases with 6 fetal deaths—mortality 60 per cent.; and in Class III., 5 cases with 1 fetal death or 20 per cent. mortality.

(TABLE VII.).

MORTALITY, FETAL AND MATERNAL, IN ITS RELATION TO THE DEGREE OF PELVIC CONTRACTURE.

	Conjugata diagonalis.	Total cases.	Forceps.	Version.	Extraction.	Symphysiotomy.	Destructive operations.	Death, maternal.	Death, fetal.	Mortality, maternal.	Mortality, fetal.	
Class I.	11.50 cm.....	5	3	2	.....	.....	.....	.....	1	.....	20%	Fetal mortality, Class I. 25%
	11.25 cm.....	2	.....	1	1	.....	.....	.....	1	.....	50%	
	11.00 cm.....	21	10	6	3	.....	2	1	5	4.76%	23.81%	
	10.75 cm.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Class II.	10.50 cm.....	4	.....	3	.....	.....	1	1	2	25%	50%	Fetal mortality, Class II. 60%
	10.25 cm.....	2	1	1	.....	.....	.....	.....	2	.....	100%	
	10.00 cm.....	4	2	2	.....	.....	.....	.....	2	.....	50%	
Class III.	9.75 cm.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	Fetal mortality, Class III. 20%
	9.50 cm.....	2	.....	.....	.....	1	1	1	1	50%	50%	
	9.25 cm.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	
	9.00 cm.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	
	not taken.....	3	3	.....	.....	.....	.....	.....	.....	.....	.....	
	Totals.....	46	21	15	4	2	4	3	14	8.69%	30.43%	

This definitely shows that in the lesser and more marked degrees of pelvic deformity where the indications for operations are comparatively simple, and there is little doubt in the mind of the operator as to which operation is the most suitable for the case, the results are good, while, on the other hand, in the medium grades of contraction, those pelves which occur just in the border line, and where there is greater necessity for



the exercise of judgment and skill, the results show a much higher fetal death rate.

In Table VII. the cases have been separated in this way, and clearly serve to demonstrate the point just made.

Considering next the fetal and maternal mortality from the standpoint of the various forms of pelvic deformity, our figures show that the greatest danger, both for mother and child, is found in those pelvis which we have classified as irregular form. Our figures here, however, are based upon so few cases that we are not justified in attempting to draw conclusions from them. Next in order come the generally contracted pelvis, then the flat rachitic, and finally those classified as simple flat.

In the next set of tables (Tables VIII., IX., X., and XI.) each of the different forms have been considered, both as to the results to the mother and child.

(TABLE VIII.).

## MORTALITY IN VARIOUS FORMS OF PELVIC CONTRACTION.

*Generally Contracted Pelvis:*

Operation.	Total cases.	Maternal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.	Fetal Deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.
Forceps .....	10	1	.....	10	.....	1	.....	10	.....
Version .....	5	.....	.....	.....	.....	2	1	40	20
Extraction .....	1	.....	.....	.....	.....	1	1	100	100
Symphysiotomy .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Destructive operations..	2	1	.....	50	.....	2	.....	100	.....
Totals .....	18	2	.....	11.11	.....	6	2	33.33	11.11

(TABLE IX.).

*Simple Flat Pelvis:*

Operation.	Total cases.	Maternal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.	Fetal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.
Forceps .....	3	.....	.....	.....	.....	1	.....	.....	.....
Version .....	5	.....	.....	.....	.....	1	1	20	20
Extraction .....	1	.....	.....	.....	.....	.....	.....	.....	.....
Symphysiotomy .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Destructive operations..	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals .....	9	.....	.....	.....	.....	1	1	11.11	11.11

(TABLE X.).

*Rachitic Pelves:*

Operation.	Total cases.	Maternal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.	Fetal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.
Forceps .....	7	.....	.....	.....	.....	1	1	14.28	14.28
Version .....	3	.....	.....	.....	.....	3	2	100	66.66
Extraction .....	2	.....	.....	.....	.....	.....	.....	.....	.....
Symphysiotomy .....	1	.....	.....	.....	.....	.....	.....	.....	.....
Destructive operations..	1	.....	.....	.....	.....	1	.....	100	.....
Totals .....	14	.....	.....	.....	.....	5	3	35.71	21.42

(TABLE XI.).

*Irregular Forms of Pelvic Deformity:*

Operation.	Total cases.	Maternal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.	Fetal deaths.	Due to operation.	Actual mortality. Per cent.	Corrected mortality. Per cent.
Forceps .....	1*	.....	.....	.....	.....	1	1	100	100
Version .....	2*	.....	.....	.....	.....	.....	.....	.....	.....
Extraction .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Symphysiotomy .....	1†	1	1	100	100	.....	.....	.....	.....
Destructive operations..	1‡	.....	.....	.....	.....	1	.....	100	.....
Totals.....	5	1	1	20	20	2	1	40	20

\*Coxalgia. †Spondylolisthesis. ‡Osteomalacia.

The question of morbidity is much broader than that of mortality, for we have to consider not only the fatal cases, but any case having a rise in temperature above the normal during the puerperium, together with any injury which has been received by the mother or child. The question of puerperal temperature is a difficult one, and we find in most statistics on this subject that the observers classify all puerperal temperatures above a certain point as abnormal, and upon them base their actual morbidity. The corrected morbidity they calculate by ruling out certain cases in which the rise of temperature has been obviously due to some cause outside the uterus—as breasts, bowels, suppuration of perineal wound, etc., etc. I think, however, that this division is an unjustifiable one, for we have repeatedly proven that it is impossible to exclude the uterine origin of the fever, unless that organ has been shown to be sterile by bacteriological examination. As examples of

this, we may cite cases of slight rises of temperature which might perfectly well have been attributed to the bowels, or engorged breasts, had not cultures shown the presence of streptococci within the uterine cavity, and, conversely, other cases with high temperature, which, at the outset, had every appearance of puerperal infection, and might have been considered as such had not the cultures been sterile.

For this reason, in making up the mortality table (Table XII.), I have distinguished between normal and abnormal puerperia, and further subdivided the abnormal puerperia according as the bacteriological examination of the uterine lochia showed the presence or absence of pyogenic organisms. In this way, I think, we can say very definitely which temperatures we are responsible for, and include only these cases in our column of "corrected morbidity."

Separating the cases in this way, we find that after 46 operations there were 32 puerperia which ran a normal course, and 14 puerperia which, under the above classification, can be put down as abnormal.

(TABLE XII.).

## PUERPERAL MORBIDITY.

Operations.	Number of cases.	Normal puerperia.	Abnormal puerperia.							Actual morbidity. Per cent.	Corrected morbidity. Per cent.
			Infected at operation.	Infected before admission.	Infections non-pyogenic.	Cause unknown. Uterus sterile.	Cause unknown.	Total abnormal puerperia.	Abnormal puerperia due to operation.		
Forceps.....	21	17	0	2	3	0	0	4	0	19.04	.....
Version.....	15	9	2	0	0	0	4	6	2	40.	13.33
Extraction.....	4	3	0	0	0	1	0	1	0	25.	.....
Symphysiotomy.....	2	1	1	0	0	0	0	1	1	50.	50.
Destructive operations.	4	2	0	2	0	0	0	2	0	50.	.....
Totals.....	46	32	3	4	3	1	4	14	3	30.43	6.52

In the above table it will be seen that the abnormal puerperia have been divided into five groups: First, "infected at operation," in which bacteriological examination distinctly showed that the infection was due to bacteria introduced at the time of operation. There are only three cases in this group; the first, a case of eclampsia delivered by accouchement forcé,

in which infection with the *bacillus coli communis* took place from the rectum during operation; the second, a case of placenta prævia infected at operation with the streptococcus, which was traced to another such case in the ward at the time; and, lastly, our fatal case of symphysiotomy. These are the cases for which we consider ourselves as responsible, and those which we have put under corrected morbidity.

In the second division of abnormal puerperia, "infected on admission," pyogenic organisms were found in specimens of the lochia, taken immediately after delivery, in women who had been operated upon before entering the clinic. From the third, "infections non-pyogenic," we obtained in our cultures organisms which could not be identified, and grew either anaerobically or did not grow upon the usual media. These were all slight rises of temperature and possibly examples of auto-infection. In the fourth class, "cause unknown; uterus sterile," the temperature could not be accounted for, but the uterine origin was eliminated by culture. In the last class of abnormal puerperia, "cause unknown," no bacteriological examination was made on account of some condition on the part of the mother, such as eclampsia or severe perineal laceration; these were all slight rises and did not persist; had they done so a culture would have been made.

Summarizing the results thus obtained, it is seen that we have 14 abnormal puerperia after 46 operations, making our actual morbidity 30.43 per cent.; but in only 3 of these 14 abnormal puerperia was the operation responsible for the abnormality, and our corrected morbidity will be much lower, as is shown in the table, 6.52 per cent. These results, I think, are excellent, and could not possibly have been obtained had a bacteriological examination not been made. The maternal deaths are, of course, included in these statistics.

Injuries to the mother following the operations have not been excessive, and can be summarized as follows: Slight laceration of the perineum in 12 cases; extensive laceration of the perineum, but not involving the sphincter-muscle, in 3 cases; complete laceration into the rectum in 1 case. There were three lacerations of the cervix, and in the two cases of symphysiotomy, rather extensive laceration of the anterior vaginal wall; 1 rupture of the uterus, and two cases in which a provisional diagnosis of injury to the pelvic articulations was



made. If we exclude the 12 slight lacerations of the perineum, which might perfectly well have occurred had the labors been normal, and the rupture of the uterus, for which neither we nor the operation were responsible, our results are not bad.

(TABLE XIII.).

## INJURIES TO MOTHER.

Pelves.	Number of cases.	Laceration of perineum slight.	Laceration of perineum extensive.	Laceration of perineum complete.	Laceration of cervix.	Laceration of vagina.	Rupture of uterus.	Injuries to pelvic articulations.
Generally contracted...	18	0	3	1	2	0	1	0
Flat rachitic.....	14	5	0	0	0	1	0	0
Simple flat.....	9	0	0	0	1	0	0	1
Irregular forms.....	5	1	0	0	0	1	0	1(?)
Totals .....	46	12	3	1	3	2	1	2

Injuries to the child (i.e., not counting the fetal deaths), were comparatively slight, and can be passed over in a very few words. A number of the children had slight forceps abrasions on various parts of the head and face, which healed rapidly in every instance and gave no trouble. Very occasionally a clavicle or humerus was fractured in bringing down the arms after version; such fractures were treated in the usual manner, and always gave good results.

It is an obvious and well-known fact that all operations in contracted pelves are more difficult and there is much greater liability of complications arising than when the same operation is done in a normal pelvis. All observers agree that these complications are largely due to the distorted relation between the pelvic inlet and the presenting part, and largely to the pelvic deformity *per se*. In our series of cases I was rather surprised to find that only 12 of the operations could be spoken of as uncomplicated, and in the remaining 34 some element or other arose during the progress of the case which materially influenced our treatment.

One of the most frequent accidents to be watched for, and if possible avoided, is prolapse of the umbilical cord. This occurred 9 times, or in something under 20 per cent. of our

cases. Ludwig and Savor place the frequency of this accident at 10.2 per cent., and say that it is most common in the flat rachitic pelves. Its occurrence has somewhat increased our total operative percentage, as we have frequently had to operate upon cases with a prolapsed cord which, had this accident not occurred, might have gone on to spontaneous delivery. In these cases we have obtained the best results by immediate delivery by internal podalic version, as in our experience the cases in which the prolapsed cord can be replaced permanently are very rare.

Rupture of the membranes before complete dilatation of the cervix is another troublesome accident, and occurred 7 times in our series. In some of these cases we were able to bring about complete dilatation by the use of Champetier de Ribes' bag; and in others (for this accident is frequently accompanied by prolapse of the cord) by manual dilatation and version. Its frequency, according to Ludwig and Savor, varies with the different forms of pelvic deformity; with us it was observed 4 times in 18 generally contracted pelves, once in 14 flat rachitic, and twice in 9 simple flat.

In 11 cases there is note made of either difficult or impossible application of forceps. In the "difficult" cases the head could not be grasped in its jugo-parietal diameter, and was for this reason dragged into the pelvis in an unfavorable position. This accident is both due to the high position of the head and abnormal conformation of the pelvis, and materially increases the risk to mother and child. By the "impossible" application of forceps, we mean those cases in which the head occupied a position in which it was impossible after several attempts to grasp it with the instrument. These cases have been delivered by version with almost uniformly bad results to the child, thus accounting for high fetal mortality after such operations. If version is decided upon as the best method of delivery, it should be done as a primary operation and not after several attempts with forceps have failed. In three cases after version we have been unable to extract the after-coming head, and have been obliged to perforate in order to deliver it. This is a most unfortunate accident, and one which usually indicates bad judgment on the part of the operator; it can scarcely be avoided, however, until we are able to estimate with greater accuracy the size of the undelivered fetal head.

In the tables in the article by Reynolds, this accident was noted several times.

An important complication in obliquely contracted pelves, in which the deformity has its origin in an old coxalgia, and one which I have not seen mentioned, is the impediment offered to delivery by the firmly ankylosed hip. We have seen three such cases, in each of which the affected leg could not be flexed on the abdomen when the patient was brought to the edge of the bed for delivery. The stiff leg offered the greatest possible obstacle to our operative manipulations; in the first case it was almost impossible to apply forceps, with which we delivered a dead child. The other two patients were delivered of living children by internal podalic version; and for this reason I think we are justified in advising version as the best method of delivery in such cases, provided the pelvic measurements do not indicate a cutting operation. A number of other minor complications occurred in the present series, mention of which is made in the next table (Table XIV.).

(TABLE XIV.).

## ACCIDENTS AND CONDITIONS COMPLICATING OPERATIONS.

Pelvis.	Uncomplicated operation.	Premature rupture of membranes.	Prolapse of umbilical cord.	Difficult or impossible application of forceps.	Inability to extract after-coming head.	Impaction of presenting part.	Posterior rotation of occiput.	Ankylosis of hip joint.	Neglected cases.	Eclampsia.	Placenta previa.	Correct diagnosis not made.	Ill chosen operation.
Generally contracted.....	5	4	2	2	1	2	2	...	1	2	1	1	...
Flat rachitic.....	4	1	3	6	1	1	...	...	1	1	...	...	...
Simple flat.....	3	2	2	2	1	...	...	...	...	1	...	...	...
Irregular forms.....	...	...	2	1	...	...	...	3	1	...	...	...	1
Totals.....	12	7	9	11	3	3	2	3	3	4	1	1	1

Having analyzed our cases from every possible standpoint, what then shall be our procedure in the management of labors, when complicated by pelvic deformity, as deduced from the statistics just cited? And in the first place, we must emphasize the point that it is exceedingly difficult, if not impossible, to lay down general rules, and that each case must



be considered as an individual problem in itself and treated according to its special merits.

The reason for this is that, although we can obtain definite information of the condition of our patient's pelvic canal, by routine pelvimetry and examination before she goes into labor, yet when we come to deal with the unborn child, we are working, to a great extent, in the dark, for we have at present no accurate means of measuring the size of its head, we cannot estimate its compressibility and power of moulding under the influence of uterine contractions, nor can we predict the character and strength of the uterine contractions when the patient goes into labor.

Given, then, a case of pelvic contraction, we must base our treatment on the following points: First, the actual size of the pelvis, which can be obtained by pelvimetry, and careful examination of the pelvic canal, with the whole hand in the vagina, if necessary under an anæsthetic. Second, the apparent size of the child, as obtained by abdominal palpation, and the apparent size of its head, as ascertained by vaginal examination. And third, the relation between the size of the pelvis and the presenting part, which may be roughly ascertained by having an assistant press it strongly down from above, and ascertaining with our hand in the vagina, if it can be made to enter the superior strait.

For the sake of convenience we will divide the pelves into three classes, as has been done in Table VII., and consider first those in which the degree of contraction is moderate; and those in which it is very marked (minor forms with the conjugata diaganolis 11.5-10.5 cm., and marked forms in which this measurement falls below 10 cm.); these are the pelves in Class I. and III. in the tables; and the figures clearly show that the fetal mortality in them is comparatively low, in contradistinction to the high fetal mortality in Class II. It is obvious that in such cases that the indications are definite, and the operator should have no difficulty in deciding upon the best operation for delivery, for in the minor grades the labor will either be spontaneous or the head will become so well engaged in the pelves, after a few hours of good uterine contractions, that its delivery by forceps is a comparatively simple matter. And in the third class, where the contraction is well marked, one of the radical operations at once suggests itself, or if the child be

dead, and the contraction not absolute, delivery can be effected by craniotomy.

It is in that class of pelves, however, which are just on the border line between the other two, in which the conjugata diagonalis measures 10 cm., or thereabout, that cause the greatest amount of anxiety and are the most difficult to treat. From what we have observed in such cases, we think that the following is the proper method of treatment: The patient, being allowed to go to term, is put to bed as soon as definite labor pains begin, and kept there throughout the labor. This lessens the liability to prolapse of the umbilical cord and premature rupture of the membranes, which accidents should always be looked out for. At the close of the first stage, after spontaneous rupture of the membranes, if the head applies itself to the pelvic brim in one of the typical presentations, and there is no reason for immediate delivery, she is allowed to have several hours of good second stage pains, in order to bring about as much moulding of the head as possible. The condition of both mother and child being, of course, carefully watched during this time.

In the meantime, everything having been made ready for a possible Cæsarean section, the patient is anæsthetized and placed upon the operating table. Tarnier axis traction forceps should now be carefully applied over the sides of the head, if possible, and, by a *few* well applied tractions in the axis of the superior strait, an attempt is made to make the head enter the pelvis. If the blades have been well fitted to a head of ordinary dimensions, this manœuvre will be successful, and the child will be delivered without injury. But in the event of the head not coming into the pelvis, (unless we have reason to believe that the child is very small, when it can be delivered by version) an immediate Cæsarean section should be done.

I do not wish to be misunderstood in making this statement, and thought to believe that pelves of such dimensions are indications *per se* for the Cæsarean operation; for, as has just been said, the great majority of such cases will be delivered by forceps; nor do I mean that such can be our method of procedure in private practice, for here we have to make the best of the conditions in which we are placed. But with patients in a well-appointed lying-in hospital, where we believe our methods approach the ideal, I think that in Cæsarean sec-

tion we have an absolutely certain method of delivering a living child, which has not been injured by ineffectual attempts at forceps and version, standing out in strong contrast to the uncertain delivery by symphysiotomy or a difficult version through a small pelvis.

It is impossible to conclude an article on the operative treatment of contracted pelves without referring to the much discussed question as to the relative merits of forceps and version. Being guided strictly by our figures, it would seem that forceps is decidedly the better procedure, as, after this operation, we have had only 3 fetal deaths in 21 cases, while in 15 children delivered by version, 6 were born dead. As we have said, however, it is evident that our fetal mortality with the latter operation is decidedly too high, and that this is probably due to the fact that so many of our versions were done after ineffectual attempts at forceps.

If version is decided upon, it should be done as a primary operation, and only in the minor grades of pelvic contraction, namely those which we have included in Class I., Table VII., and if done under these conditions, should undoubtedly give better results than a difficult forceps operation on a high or floating head. On the other hand, in those cases in which the contraction is so marked as to cause any doubt in the mind of the operator as to his ability to extract the child through the intact pelvis, version should never be attempted, for when begun it must be completed in a very short space of time, and we cannot, as in the case of forceps, make a tentative attempt and then change our tactics.

We have shown that in certain forms of obliquely contracted pelves, particularly those due to an old coxalgia, where there is an accompanying ankylosis of the hip joint, version is a more suitable operation than forceps, for the inability to flex the stiff leg offers the greatest possible impediment to the proper introduction of the blades.

It seems almost superfluous to add that it should be borne in mind that a large percentage of contracted pelves (in our series 65 per cent.) are delivered spontaneously, without artificial aid of any kind, and that the minor grades of contraction are not necessarily indications for operative interference. In such cases nature should always be given



a fair chance before resorting to instrumental intervention.

#### CONCLUSIONS.

1. In 131 cases of contracted pelves there was necessity for operative delivery 46 times, 35.11 per cent.

2. The pelves most frequently requiring operation are the rachitic and irregular forms. The generally contracted pelvis, though very common in the negro race, is comparatively rarely sufficiently deformed to seriously obstruct labor.

3. Pelves, in which the degree of contraction is slight, and those in which the contraction is very marked, are the easiest for treatment, as in both cases the indications are definite, and should give the operator little trouble in deciding upon the treatment to be pursued.

4. On the other hand the pelves possessing a medium degree of contraction are the most perplexing, and call for the exercise of the greater skill and judgment. When proper appliances are at hand, such cases are best treated by tentative application of forceps, and this failing, immediate Cæsarean section.

5. In general, forceps give a lower fetal mortality than version, but version done as a primary operation on a movable head, in a slightly contracted pelvis, is a safer operation for the child than a difficult high forceps operation.

6. Except in very exceptional cases, symphysiotomy is not to be compared with Cæsarean section, for the former operation, besides causing greater injury to the mother, is always an uncertain procedure.

7. Operations on contracted pelves are rarely uncomplicated. Among the commonest accidents may be mentioned premature rupture of the membranes and prolapse of the umbilical cord.

8. The only rational and scientific method of obtaining "corrected morbidity" statistics is by the bacteriological examination of the uterine lochia, for only in this way can we say definitely which infections are the result of operation.

The following tables (XV., XVI., XVII., XVIII. and XIX.) are those upon which the preparations of these statistics are based:

Table XV.—Forceps for Contracted Pelves—House Cases.

No.	Name and No.	Pelvis.	Position	Operator.	Notes on operation.	Injury to Mother.	Peric- perium.	Result maternal	Child Sex.	Weight.	Head.	Injuries.	Results.	Remarks.
1	M.M. H. 20.	Flat rachitic. 26, 27, 31, 16.5, 10.25, 8.25	L.O.I.T.	Williams	High operation. Blades first applied over ears; but impossible to rotate; reapplied over face and occiput; head brought into pelvis with ease, but on account of transverse position extraction was very difficult. Tarnier axis traction forceps.	Slight median tear; repaired at once.	Slight fever 100.9	Excellent	Male	1300	O.F. 11 O.M. 11 S.O.B. 10 Bip. 8.25 Bit. 7.1 Circ. 32.5	None apparent	Dead.	Symphysiotomy considered; autopsy on child; brain normal; no hemorrhages; no fracture of cranial bones
2	I.P. H. 37	Generally contracted 23.5, 25.75, 28, 18, 11.5, 9.5	R.O.I.A.	Dobbins	Medium operation; prolonged second stage; blades over ears. Tarnier axis traction forceps.	None.	Normal 100.2	Excellent	Female	2785	O.M. 12.5 O.F. 11.5 S.O.B. 9.7. Bip. 9 Bit. 8 Circ. 34.3	None	Living	
	R.B. H. 78	Flat rachitic 25.5, 25, 29.5, 15.5, 9.75, 7.75	R.O.I.A.	Williams	High forceps; impossible to apply blades over ears; oblique application; head brought to pelvic floor; blades changed and applied over ears. Tarnier axis traction forceps.	None.	Normal 101.2 P.R.	Excellent	Female	3540	O.M. 12.75 O.F. 11.75 S.O.B. 9.6 Bip. 8.75 Bit. 8.15 Circ. 32	None Slight asphyxia	Living	Symphysiotomy considered, but under anesthetic head made to enter pelvis, therefore tentative attempt at forceps was decided upon.
4	M.L. H. 110	Generally contracted 23, 25.5, 28, 17, 9, 7.	R.O.I.T. Ant. parietal	Williams	High operation; blades applied over ears in usual; delivery not particularly difficult. Tarnier axis traction forceps.	None.	Normal 99.4	Excellent.	Male	3210	O.M. 15 O.F. 11.75 S.O.B. 10.5 Bip. 10.25 Bit. 8.75 Circ. 35.5	Prom'tory depression on right parietal bone	Living	Symphysiotomy considered; tentative attempt at forceps decided upon.
5	M.M. H. 115	Generally contracted 23.5, 25, 29, 17.5, 11, 9.5	R.O.I.P.	Dobbin	Medium operation; difficult on account of mistake in diagnosis; thought to be L.O.I.A.; forceps removed several times; head would not rotate; occiput delivered posteriorly. Tarnier axis traction forceps.	None.	Febrile. 101.6 m. Seventh day. Ut. Culture. Negative.	Excellent	Male	3000	O.M. 14.50 O.F. 12.25 S.O.B. 9.25 Bip. 8.75 Bit. 7.50 Circ. 31.50	Face much bruised No fractures	Living Entirely well Gained weight	Difficulty in operation entirely due to the fact that mistake was made in diagnosis.
6	L.L. H. 118	Generally contracted 22.5, 23.5, 29, 17(0) 11(0)	L.O.I.T.	Dobbin	Early rupture of membranes; prolonged second stage; medium operation; manual dilation of cervix; forceps over ears without difficulty. Tarnier axis traction forceps.	Slight tear of cervix on left side.	Normal 101. P.R.	Excellent	Male	2785	O.M. 12.5 O.F. 10.75 S.O.B. 8.25 Bip. 9.25 Bit. 8.25. Circ. 29.	None	Living	

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to Mother.	Puerperium	Results Maternal	Child. Sex.	Weight.	Head.	Injuries.	Results	Remarks.
7	L.T. H. 183	Flat rachitic, 23.75, 24.5, 30.5, 17.75, 11, 9.	R.O.I.T.	Dobbin	High operation; head did not engage at end of second stage; artificial rupture and prolonged second stage did not cause engagement; first application oblique. Changed to over ears when head reached floor. Tarnier axis traction forceps.	Slight tear of perineum. Closed at once.	Normal, 100.2	Excellent	Male	3200	O.M. 14 O.F. 12 S.O.B. 10 Bip. 9.5 Bit. 8 Circ. 31.75	None Slight asphyxia	Excellent.	
8	G.E. H. 197	Generally contracted 22.5, 24, 26, 16.5, 10, 8	L.O.I.T. Post parietal	Dobbin	High operation; blades applied over ears, as usual; not particularly difficult. Tarnier axis traction forceps.	None.	Normal, 100.4	Excellent	Female	3350	O.M. 14 O.F. 10.75 S.O.B. 9 Bip. 9 Bit. 8 Circ. 30.5	Slight abrasions under ears	Excellent.	
9	S.R. H. 287	Generally contracted 21.5, 23.5, 28, 17, 10, 8.25	L.O.I.A.	Dobbin	High operation; dilatation of cervix with Champetier de Ribes bag; application as usual; considerable difficulty in getting head to engage. Tarnier axis traction forceps.	Perineum intact, cervix, bilateral laceration.	Febrile, See remarks. 103.	Good	Male	3690	O.M. 14 O.F. 11.25 S.O.B. 9 Bip. 9.25 Bit. 8.50 Circ. 40	Slight abrasions	Excellent.	Patient admitted in labor; had high fever for six days, which then dropped to normal and remained so. Uterine cultures made twice — immediately after labor and in the third day of the puerperium; in the first instance a few short, thick bacilli on slips which could not be grown in any media; in the second anaerobic bacillus growing only a glucose agar. Sepsimia.
10	A.F. H. 28	Simple Flat 23, 25, 30, 18(?)	L.O.I.A.	Dobbin	Prolonged second stage; medium forceps; slight tear of perineum. Tarnier axis with good result. traction forceps.	Tear of perineum; repaired at once with good result.	Febrile, 102.6	Excellent	Male	3435	O.M. 14 O.F. 11.5 S.O.B. 9.5 Bip. 9.25 Bit. 8.25	None	Excellent.	Uterine culture showed same organism as found in vagina before labor. Sepsimia.

## Out Cases.

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to Mother.	Puerperium.	Result maternal.	Child, Sex.	Weight.	Head.	Injuries.	Results.	Remarks.
11	L.J. O.33	Flat rachitic; 23, 24, 30, 18, 11	L.O.I.P.	Williams	High operation; blades applied to sides of head; delivery of head in transverse position. Tarnier axis traction forceps.	None.	Normal, 99	Excellent	Female	7 pounds 8 ounces	O.F. 11 S.O.B. 10 Bip. 9 Bit. 8	None	Living	
12	Mrs. M. O.35	Generally contracted 21, 22.5, 29, 16.5	R.O.I.P.	Williams	High operation; blades applied not to side of head but to side of pelvis; occiput did not rotate anteriorly, but delivered over perineum; difficult op. Tarnier axis traction forceps.	Extensive tear of perineum to 1 cm. anus; sutured at once; result good.	Normal, 100.4	Excellent	Male	7 pounds	O.F. 11.5 S.O.B. 9.5 Bip. 9 Bit. 8	Slight bruising	Living	
13	S.D. O.59	Flat rachitic; 22, 24, 29, 17, 11	R.O.I.P.	Williams	High operation; blades to side of head with some difficulty; delivery not difficult. Tarnier axis traction forceps.	None.	Normal, 99.1	Excellent	Female	7 pounds	O.F. 11.5 S.O.B. 9 Bip. 8.5 Bit. 8	None	Living	
14	M.B. O.69	Unilateral old coxalgia; 21 5 24 30 17 C.D. not reached	L.O.I.T.	Williams	High operation; very difficult; blades to sides of pelvis; application difficult due to pelvic deformity and analysis of leg; blades slipped several times before head reached outlet. Tarnier axis traction forceps.	None.	Normal, 101.6	Excellent	Female	5 pounds 4 ounces	O.F. 11.5 S.O.B. 9 Bip. 8 Bit. 8	Fatal asphyxia; "asphyxia pallida."	Dead	Pelvic measurements do not indicate the amount of contraction, which was marked, oblique, due to old coxalgia; promontory could not be reached, (child would probably have been saved by version).
15	Mrs. C. O.113	Simple flat 24 30.5 26 18	L.O.I.T.	Dobbin	High operation; blades could not be applied to side of head, but to sides of pelvis; head brought to outlet with great difficulty; delivered with Simpson's forceps. Tarnier axis traction forceps.	Very slight tear of perineum.	Normal, 100.	Excellent	Female	7 pounds 12 ounces	O.F. 11 S.O.B. 7 Bip. 9 Bit. 8	Slight abrasions	Excellent	
16	S.G. O.136	Flat rachitic; 22.5 23 27 17.5 11	R.O.I.P.	Dobbin	High operation; Scanzoni operation; difficult. Tarnier axis traction forceps.	Tear of perineum; sutured at once.	Normal, 100.	Excellent	Male	8 pounds	O.F. 13.5 S.O.B. 11.5 Bip. 11 Bit. 10.5	Cephal-hematoma	Excellent	
17	S.S. O.151	Gen'l cont. 22.5 24 29 11.5	L.O.I.A. L.S.I.A.	Dobbin	Low operation; uncomplicated. Simpson forceps.	None.	Normal, 100.8	Excellent	Male	4 pounds	O.F. 10.5 S.O.B. 8.5 Bip. 7.75 Bit. 7	None; asphyxia	Excellent	Twins; first child delivered by forceps; not pelvic indication.



No.	Name and No.	Pelvis.	Position.	Operator.	Notes on Operation.	Injury to Mother.	Puerperium.	Result maternal.	Child, Sex.	Weight.	Head.	Injuries.	Results.	Remarks.
18	I.C. O.166	Gen'l cont. 22.5 24 27 19 11	R.O.I.P.	Dobbin	High operation; head could not be made to rotate anteriorly; occiput delivered over perineum.	Tear to anus; sutured at once with good result.	Normal, 100.	Excellent	Male	9 pounds 9 ounces	O.F. 12 S.O.B. 9.75 Bip. 9.5 Bit. 7.5	Few abrasions; asphyxia slight	Excellent	
19	C.D. O.210	Gen'l cont. 22.5 25 28.5 18.5 11(?) 9.75	L.O.I.A.	Dabney	Neglected case of midwife; patient in bad shape when first seen; uterus tetanic; retract'n ring well marked pulse 130; forceps on L.O.I.A. at once; delivery not difficult; patient collapsed; pulse going to 160-170. weak and almost imperceptible; diagnosis of rupture of uterus made and patient urgently advised to enter hospital; this she refused positively; child dead before delivery. Simpson's forceps.	Rupture of uterus	Died on seventh day	Death; See autopsy	Male	12 pounds	O.F. 13 S.O.B. 10 Bip. 9 Bit. 7	None apparent	Dead	Autopsy: rupture of uterus at junction of upper and lower uterine segment; hematoma behind peritoneum; general purulent peritonitis; bacteriological examination. <i>Uterus.</i> — Bac., coli com., slaph, epid, alb. saprophytic bacteria. <i>Peritoneum</i> , staphylococcus epid. alb.
20	Mrs. S. O.213	Simple flat 25 27.5 32 18 11	L.O.I.T.	Dobbin	Head did not enter pelvis after some time in second stage. High forceps. Tarnier axis traction forceps.	None.	Normal, 98.7	Excellent	Male	8 pounds 12 ounces	O.F. 13 S.O.B. 11.5 Bip. 9.75 Bit. 8.75	Slight abrasions	Excellent	
21	E.K. O.216	Flat rach. 23.5 24 29.5 18 11	R.O.I.P.	Dobbin	Medium application to R.O.I.T.; not difficult. Tarnier axis traction forceps.	Very slight tear.	Normal, 98.4	Excellent	Male	8 pounds 8 ounces	O.F. 11.5 S.O.B. 9.75 Bip. 8.5 Bit. 7.5	None	Excellent	

Table XVI.—Version in Contracted Pelves.—(House Cases.)

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
1	S. W., H. 107	Flat rachit 25.25 26 28 17 10 8	L. O. I. A.	Williams	Accouchement forcé, immediate indication eclampsia; internal podalic version without difficulty. After coming head arrested at superior strait and could only be delivered by craniotomy.	Perineum torn; repaired at once with excellent results.	Febrile, 102.6 (see remarks)	Excellent	Male	2077 without brain	O. M. 12 O. F. 12 S. O. B. 10 Bip. 9.5 Bit. 7.5 Cir. 35 Crushed head	Head crushed	Dead	Infection; direct at operation, with feces; uterine culture showed bac. coli com.; fever ran a very slight course, and patient completely recovered
2	A. H., H. 139	Flat rachit 24.4 24.2 28 17.2 11 9.5	Brow, face to right	Williams	Premature rupture of membranes; prolapse of cord; manual dilatation of cervix; version very difficult, child extracted dead.	Not torn, postpartum hemorrhage shortly after labor.	Febrile, 101.6	Excellent	Female	2500	O. M. 12 O. F. 10.5 S. O. B. 9 Bip. 9 Bit. 8 Cir. 32	None apparent	Dead	No uterine culture, due to patient's condition; only slight pyrexia, which subsided on 6th day.
3	K. H., H. 243	Simple flat 27.5 29 31 19 10.5 8.5	L. O. I. A.	Williams	Premature rupture of membranes, dilatation of cervix with Champetier de Ribes' balloon; version not excessively difficult to after coming' head. This gave some trouble, but was extracted by the Moriceau Smellie Veit method.	Slight tear through old scar tissue, considerable tear of cervix repaired at once.	Febrile, 102	Excellent	Male	3050	O. M. 13 O. F. 12 S. O. B. 10.25 Bip. 9.6 Bit. 8.25 Cir. 32	None apparent	Fair; did not gain weight.	Pyrexia during puerperum not accounted for by culture, probably not infectious.
4	M. M., H. 320	Gen. con. 22 24.5 28.5 11.25 29.5 9.25	L. O. I. A.	Dobbin	Placenta previa lateralis, cervix dilated with Champetier de Ribes' bag; loss of liquor amnii during version, and uterus contracted over child, making internal version very difficult; extraction easy.	None	Febrile, 102.1 see note	Excellent	Female	1500	O. M. 11.5 O. F. 10 S. O. B. 8.75 Bip. 7 Bit. 6 Cir. 26	Asphyx.	Died 3 hrs. p.p.	Patient infected with streptococcus pyogenes, infection definitely traced to M. S., H. 316 (see destructive table). Infection proved mild and required no treatment; child premature, death not due to oper.
5	A. Z., H. 349	Simple flat 25.5 28 28.5 18.5 11 9	L. O. I. P.	Schenck	Head did not enter pelvis at end of first stage; membranes ruptured accidentally during exam., cord prolapsed; version, internal podalic, not particularly difficult.	Medium tear of perineum, sutured at once with good results.	Normal, 100.1	Excellent	Male	3200	O. M. 12.5 O. F. 12 S. O. B. 11.25 Bip. 9 Bit. 7.5 Cir. 30	Slight asphyxia	Excellent	
6	L. J., H. 170	Simple flat 25.5 27 31.6 18.5 10.5 9	R. O. I. T.	Williams	Patient admitt'd in eclampsia; accouchement forcé, dilatation of cervix and version.	None	Normal	Improved	Female	2400	O. M. 12.25 O. F. 11.5 S. O. B. 9.75 Bip. 9.25 Bit. 8.25	None	Excellent	Mother had a convulsion on the 4th day of the puerperium. Slight albuminuria on discharge.

# (Out Cases.)

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
7	B. B., H. 219	Gen'l cont. 23 25 28 17 11 9.5	L.O.I.T.	Dobbin	Patient admitted in threatened eclampsia, symptoms increased, delivery by accouchement forc�, dilatation and version.	None	Normal	Improved	Female	765	Not measured	None	Died � hr. p.p.	Death of the child due to the fact it was premature, only six months.
8	D. C., H. 295	Gen'l cont. 23.5 25.5 28 18.5 11.5	R.O.I.T.	Dobbin	Patient seen in Out Patient Department in eclampsia, delivered at once by accouchement forc�, rather difficult version.	None	Febrile	Improved	Female	1970	O.M. 11.5 O.F. 9.75 S.O.B. 8.5 Bip. 8 Bit. 7.5	Fracture of left humerus	Excellent	No uterine culture on account of mother's condition, probably not septic, Had in all 20 convulsions.

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
9	M. K., O. 116	Simple flat 24 29 32 20 11	L.O.I.A.	Dobbin	Head floating after considerable time in second stage; forceps attempted, but head could not be made to enter pelvis; arms above head; int. podalic version with great difficulty; inability to extract after-coming head; craniotomy.	Tear of perineum, <i>not closed</i> for fear of infection.	Normal, 99.8	Excellent	Male	10 lbs.	O.F. 11.5 S.O.B. 10.5 Bip. 9.5 Bit. 9	Head crushed	Dead	
10	M. A., O. 208	Flat rach. 24 25 32 17.5 10.25	R.O.I.P.	Dobbin	Head floating; forceps several times applied, but could not be made to grip head, slipping off each time; Int. Podalic Version difficult, child delivered dead, both arms above head.	None	Febrile, 101.2	Excellent	Male	71 lb. 8 oz	O.F. 12. S.O.B. 10.5 Bip. 9 Bit. 7.5	Fracture of humerus	Dead	Case should have been treated by a cutting operation, but would not enter hospital, and after the attempts at forceps failed, even a symphysiotomy would not have saved child.
11	Mrs. S., O. 269	Unilateral coxalgia. 24.75 26.75 30.5 20 11.5	R.O.I.T.	Dobbin	Head did not enter pelvis at end of first stage; during exam. membranes ruptured and cord prolapsed; immediate podalic version difficult, principal resistance at pelvic outlet; one arm only above head.	None	Normal, 99	Excellent	Male	10 lbs.	O.F. 12.75 S.O.B. 10.5 Bip. 10.5 Bit. 9	Probable separation of epiphysis of left ankle, due to traction	Living	

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
12	I. S., O. 378	Gen'l cont. 22.5 23.5 27.5 17.5 10.5	R.M.I.T.	Dobbin	Child in face presentation; did not enter pelvis, and at rupture of membranes cord prolapsed, int. podalic version not very difficult, arms above head giving some trouble; death due to prolapsed cord.	Extensor perineal tear to rectum, immediately sutured with good results.	Slight fever 101.6	Excellent	Male	8 lbs.	O.F. 11.5 S.O.B. 9.25 Bip. 9.5 Bit. 7.5	None apparent	Dead	Patient a little girl, 12 years old, who refused admission to hospital. Death of child due to prolapsed cord rather than version.
13	E. G., O. 618	Gen'l cont. 21.75 24.5 30 18.5 10	L.O.I.A.	Deal	Head apparently fixed in pelvis; two attempts to apply Tarnier forceps failed and cord prolapsed, so int. podalic version was done with greatest difficulty, delivering a dead child.	Slight perineal tear, closed at once.	Normal, 99.3	Excellent	Male	6 lb. 8 oz.	O.F. 11.25 S.O.B. 8.5 Bip. 8 Bit. 7	Neck considerably stretched by traction; no fracture	Dead	It was thought that the child could be delivered by forceps, had the cord not prolapsed in the attempt to apply them a symphysiotomy or Cæsa-section would have been considered.
14	L. T., O. 621	Simple flat 24.5 26.5 32 19 11	R.O.I.T.	Deal	Head movable at end of first stage; at rupture large quantities of liquor amnii escaped, and brought down a loop of cord, necessitating immediate delivery; internal version without much difficulty.	None	Normal, 99	Excellent	Female	7 lbs.	O.F. 10.5 S.O.B. 8.5 Bip. 9.75 Bit. 7.5	None; slight asphyxia	Excellent	
15	Mrs. H., O. 610	Coxalgia 26 27.5 32 20 11	L.O.I.T.	Dobbin	High degree of obliquely contracted pelvis due to coxalgia; head above brim; delivery by a difficult int. podalic version, with fracture of one clavicle.	None	Normal	Excellent	Male	9 lbs.	O.F. 11.5 S.O.B. 9.75 Bip. 9.5 Bit. 8.5	Fracture of left clavicle	Excellent	



Table XVII.—Extraction of Breech Cases in Contracted Pelves.—(House Cases.)

No.	Name, and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
1	S. N., H. 83	Simple flat 26.5 27.5 30 18.5 11 9.5	L.S.I.A.	Dobbin	Entered in labor. Exam. shows cervix completely dilated, both feet in vagina; both feet brought down, back made to rotate anteriorly; both arms above head, brought down with great difficulty. Left clavicle fractured; chin caught over right pubic bone; great difficulty in finding mouth; head brought down in transverse pelvic diameter and extracted face posterior by Morriceau method.	Laceration of perineum repaired at once with good result. Rupture of pubic ligaments?	Febrile, 102	Excellent	Male	3730	O.M. 13.75 O.F. 11.6 S.O.B. 11.5 Bip. 10 Bit. 8.75 Cir. 36.5	Fracture of left clavicle; recovered.	Excellent	Puerperium was febrile, but culture taken on 3d day was <i>sterile</i> both for slips and cultures.
2	B. F., H. 276	Gen'l cont. 24, 27, 29.5 18.75 11.25	L.S.I.A.	Dobbin	Premature rupture of membranes before dilatation of cervix; legs extended on body of child. A foot was brought down prophylactically, and patient left for several hours to complete dilatation. Traction on legs delivered to shoulders; arms above head brought down in usual manner; efforts at extraction of after-coming head failed; craniotomy on after-coming head; Braun's cranioclasp.	Complete laceration of perineum into rectum; repaired at once, but partially broke down.	Normal, 99.8	Fair, see remarks	Male	4150	O.M. 13 O.F. 11.25 S.O.B. 10 Bip. 10 Bit. 9 Cir. 35	Head perforated and crushed.	Dead	Patient left hospital with loss of power of sphincter muscle, she later entered the service of Dr. Kelly where the perineum was completely repaired with excellent result.

## (Out Cases.)

No.	Name, and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Results maternal.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
3	E. D., O. 10	Flat rach. 24 26.5 28 17.5 11.5	L.S.I.A.	Williams	Legs extended against body; delivery up to after-coming head spontaneous, extraction of after-coming head by M. V. S. method, with great difficulty.	None.	Normal, 99	Excellent	Male	8 lbs.	O.F. 12 S.O.B. 11 Bip. 10 Bit. 8.5	Asphyx.	Excellent	
	..... O. 35	Ditto.	R.S.I.A.	Williams	Frank breech extraction by M. V. S. method, with little difficulty.	None.	Normal, 98.8	Excellent	Female	7 lb. 4 oz.	O.F. 11.5 S.O.B. 8.75 Bip. 8.75 Bit. 8	None	Excellent	Treated twice.

Table XVIII.—Symphysiotomies.

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on operation.	Injury to mother.	Puerperium.	Result maternal.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
1	S. B., O. 205	Rachitic 25.5 24.5 28 13.5 9.25 7.25	L.O.I.T. Post parietal.	Dobbin.	High grade of rachitic pelvis; refused admission to hospital, prolaped cord; symphysiotomy at her home. Symphysis cut through; delivery by version; considerable laceration of ant. vaginal wall.	Laceration of ant. vaginal wall.	Normal, 100	Excellent	Female,	6 lbs.	O.F. 10.5 S.O.B. 9 Bip. 8.75 Bit. 8	None	Excellent	
2	J. T., H. 261	Spondylo- listhesis. 24.5 27 29 18 9.5 7.5	Head present- ing, lying oblique.	Dobbin.	Typical case of spondylo- listhesis; refused to allow operation until labor set in; operation ill chosen, but a living child was delivered, symphysis cut through delivery by version; considerable laceration of ant. vaginal wall.	Laceration of ant. vag. wall.	Febrile, 102	Death	Male	3085	O.M. 13.4 O.F. 11.6 S.O.B. 9.6 Bip. 9.1 Bit. 7.7 Cir. 32	None apparent	Died two weeks later; enteritis	Death of patient due to an intense intestinal atony which developed after operation, so that it was exceedingly difficult to get the bowels to move. Autopsy not made until several days after death, so that bacteriological records are not of value, <i>probably an infection</i> . Death of child not due to operative delivery. Operation ill chosen; should have had Caesarian section

Table XIX.—Destructive Operations.

No.	Name and No.	Pelvis.	Position.	Operator.	Notes on Operation.	Injury to Mother.	Puerperium.	Results.	Child sex.	Weight.	Head.	Injuries.	Results.	Remarks.
1	S.W., H. 296	Gen'l cont. 22.5 24.25 28 17.5 11 9	L.Acr. I.A.	Dobbin	Patient seen in out patient department with transverse presentation; admitted for version when it was found that uterus had contracted tightly over child, so that after several attempts version was abandoned, and decapitation done with Braune blunt hook; child dead before delivery.	None.	Slight fever 101	Excellent	Male	.....	O.M. 11.50 O.F. 9.755 S.O.B. 8.25 Bip. 7.25 Bit. 6 Cir. 25	Decapitated	Dead before delivery	
2	M.S., H. 316	Rachitic, 23.5 23.5 28 16.5 9.5 7.5	L.O.I.T.	Williams	High grade of rachitic pelvis, unrecognized by her physician, who had been applying forceps for some hours; cord prolapsed; child dead; no attempt at engagement; patient already infected; perforation; extraction with Braun's cranioclast.	None; by craniotomy; infected before admission.	Febrile, 103.2	Excellent	Male	1875 without brain	O.M. 13.00 O.F. 12.10 S.O.B. 9.75 Bip. 9.75 Bit. 8.50 Cir. 29.75 (crushed head)	Head crushed	Dead before delivery	Patient infected on admission; uterine culture showing following organisms: (1) Streptococcus pyogenes; (2) staphylococcus pyogenes aureus; (3) bac. col. communis; (4) bac. aerogenes capsulatus.
3	P.A., O. 56	Gen'l cont. 22.5 25 28 17 10.5	L.O.I.A.	Williams	Neglected case; in charge of a midwife; child dead; tympania uteri; patient in bad condition; difficult craniotomy, and extraction with blunt hook.	Patient infected at time of operation; no apparent injury.	Febrile, 101.2	Death third day	Male	2900 without brain	Not measured	Head crushed	Dead before delivery	Patient died on third day of infection with Bacillus aerogenes capsulatus.
4	L.L., O. 144	Osteomalacia. 23 28 31 19 11	Brow, face left.	Williams	Case of osteomalacia; child dead when first seen; difficult craniotomy and extraction.	Very slight tear of perineum.	Normal, 99.2	Excellent	Female	8 pounds 4 ounces without brain	Not measured	Head crushed	Dead before delivery	Typical case of osteomalacia; pelvic measurements do not indicate the amount of deformity present.



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